

**REMARKS**

By this amendment, the claim status identifier of claim 1 has been corrected. Claims 10 and 17 were previously cancelled. Claims 1-3, 18 and 19 stand withdrawn from consideration. Claims 4-9, 11-16 and 20-22 are presented for further examination.

Initially, Applicants reassert that the restriction requirement with respect to claim 1 is improper. While Applicants appreciate the Examiner's proposed change to claim 1, limiting claim 1 to unpolymerizable compounds would result in an incorrect characterization of claims 1-3 (Group I). Rather, claim 1 is generic to both polymerizable monomers and the resulting polymers. Further, as a generic linking claim, claim 1 must be examined together with the elected claims. See MPEP §809.03. Reconsideration and withdrawal of the restriction requirement with respect to claim 1 are respectfully requested.

The rejection of claims 4, 5, 11 and 12 under 35 U.S.C. § 103(a) over Ohmori, U.S. 4,644,043, in view of Mowrer, U.S. 6,013,752, the rejection of claims 4 and 11 over Suzuki, WO 88/09799, in view of Mowrer, the rejection of claims 6-9, 13-16 and 20-22 under 35 U.S.C. § 103(a) over Ohmori and Mowrer in further view of U.S. Patent Publication No. 2003/0232940 to Komoriya, and the rejection of claims 5-9, 12-16 and 20-22 under 35 U.S.C. § 103(a) over Suzuki and Mowrer in further view of Komoriya are respectfully traversed.

Ohmori and Suzuki each disclose a polymer comprising the structural moiety -O-R<sup>1</sup>-CF<sub>2</sub>-CF(CF<sub>3</sub>)OR<sup>2</sup>. However, each of independent claims 4 and 11 requires the fluorine-containing compound to include the structure represented by formula 1, i.e., -O-R<sup>1</sup>-CF<sub>2</sub>-CH(CF<sub>3</sub>)OR<sup>2</sup>. Ohmori and Suzuki each fail to disclose the claimed structure. Moreover, neither reference suggests replacing the underlined fluorine atom with a hydrogen atom, as claimed. This deficiency of both Ohmori and Suzuki is not remedied by Mowrer.

Mowrer discloses four fluoroalcohols (i.e., hexafluoro-isopropanol (CF<sub>3</sub>-CH(OH)-CF<sub>3</sub>), hexafluoro-2-methyl-isopropanol (CF<sub>3</sub>-C(CH<sub>3</sub>)(OH)-CF<sub>3</sub>), heptafluoro-propanol (CF<sub>3</sub>-CF(OH)-CF<sub>3</sub>) and perfluoro-tert-butanol (CF<sub>3</sub>-

C(CF<sub>3</sub>)(OH)-CF<sub>3</sub>)) that can undergo polycondensation reactions with silicon compounds. Mowrer further discloses that the hydroxyl oxygen atom can act as a reactive site toward silicon to form the Si-O-C bond (Mowrer at column 9, lines 19-34 and column 16, line 30). Based on the express teachings of Mowrer, one with ordinary skill in the art would recognize that it is the OH group in these compounds that is essential to the polycondensation reaction.

The conclusion in the Office Action that the -CH-, -C(CH<sub>3</sub>)-, -CF- and -C(CF<sub>3</sub>)- groups within the four fluoroalcohols of Mowrer are functionally equivalent and interchangeable is an overgeneralization which extends beyond that which Mowrer reasonably teaches or suggests. The fluoroalcohols of Mowrer are distinct from the compounds disclosed by Ohmori and Suzuki and, as such, one cannot conclude that the different compounds or their sub-constituents should or would behave in a like manner. For example, in contrast to the assertion made on page 8, line 3 of the Office Action, the polycondensation reactions will **not** proceed with the structures of Ohmori and Suzuki due to steric hindrance by the R<sup>2</sup> groups.

With respect to the -CH-, -C(CH<sub>3</sub>)-, -CF- and -C(CF<sub>3</sub>)- groups, Mowrer merely teaches that fluoroalcohols comprising these groups all undergo polycondensation reactions via a reactive hydroxyl oxygen site. There is **no** teaching in Mowrer that the -CH-, -C(CH<sub>3</sub>)-, -CF- and -C(CF<sub>3</sub>)- groups are universally equivalent and interchangeable, much less equivalents in the claimed fluorine-containing compounds, nor is such a conclusion reasonably suggested by Mowrer. Pointedly, Mowrer does not provide any motivation to substitute -CF- for -CH- in the claimed fluorine-containing compounds.

In fact, as set forth below, -CH- and -CF- are **not** functional equivalents in such compounds. Because -CH- and -CF- are not functional equivalents, the combination of Mowrer with either Ohmori or Suzuki does **not** set forth a proper *prima facie* case of obviousness with respect to claims 4, 5, 11 and 12.

With respect to the rejections of claims 5-9, 12-16 and 20-22 based further on Komoriya, these claims depend either directly or indirectly from claims 4 or

11 and thus are patentable for at least the reasons that claims 4 and 11 are patentable. Reconsideration and withdrawal of each rejection is respectfully requested.

Even assuming *arguendo* that the combination of Mowrer with either Ohmori or Suzuki did make out a *prima facie* case of obviousness, such a case would be effectively rebutted by the superior properties of the claimed compounds. Applicants have determined that the properties of the claimed compounds, which are required to comprise the  $-O-R^1CF_2-\underline{CH}(CF_3)OR^2$  moiety, are superior to compounds comprising the comparative  $-O-R^1CF_2-\underline{CF}(CF_3)OR^2$  structure with respect to at least (i) water repellency (ii) alkali aqueous solution compatibility (solubility) (iii) chemical stability and (iv) etching resistance.

When a resist composition comprising the structure  $-O-R^1CF_2-\underline{CH}(CF_3)OR^2$  or  $-O-R^1CF_2-\underline{CF}(CF_3)OR^2$  is exposed to light,  $R^2$  may be released by the chemical amplification effect. With this, the structure turns into an alcohol in the form of  $-O-R^1CF_2-\underline{CH}(CF_3)OH$  or  $-O-R^1CF_2-\underline{CF}(CF_3)OH$ . Depending on the acidity of the alcohol, the resist composition may or may not be dissolved in an alkali developing solution.

In the case of the comparative structure,  $-O-R^1CF_2-\underline{CF}(CF_3)OH$ , both the underlined fluorine atom and the OH group are bound to the underlined carbon atom. As a result, the underlined fluorine atom has a substantial impact on the acidity of the alcohol, which results in a compound having an unsuitably high water repellency and too low a solubility in alkali aqueous solutions to be suitable for resist applications. In practice, a resist composition having the comparative structure  $-O-R^1CF_2-\underline{CF}(CF_3)OR^2$  swells during development in an alkali developing solution. Thus, it is not possible to obtain a fine resist pattern using a resist having the  $-O-R^1CF_2-\underline{CF}(CF_3)OR^2$  structure due to the resist swelling and the attendant defects caused during the development process.

In contrast, by replacing the underlined fluorine with hydrogen, resist compositions comprising the claimed structure (1)  $-O-R^1CF_2-\underline{CH}(CF_3)OR^2$  possess adequate water repellency and compatibility in alkali aqueous solutions,

do not swell during development, and are suitable for defining fine resist patterns. This is evidenced, for example, by Example 9 at paragraph [0059] of the specification. Such evidence in the specification of the unexpected improved results achieved by the claimed compositions in resist applications must be considered in reaching a conclusion with regard to the obviousness of the claims. *In re Margolis*, 785 F.2d 1029, 228 USPQ 940 (Fed. Cir. 1986). This evidence of improved result, which could not have been expected or predicted based on the teachings of the cited art, effectively rebuts any *prima facie case* of obviousness which might be thought to have been made out by the cited references. Consequently, the rejection under 35 U.S.C. §103 should be withdrawn.

In view of the foregoing, the application is respectfully submitted to be in condition for allowance, and prompt favorable action thereon is earnestly solicited.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned at (202) 624-2845 would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #038788.53145US).

Respectfully submitted,

September 18, 2006

  
J. D. Evans  
Registration No. 26,269

CROWELL & MORING LLP  
Intellectual Property Group  
P.O. Box 14300  
Washington, DC 20044-4300  
Telephone No.: (202) 624-2500  
Facsimile No.: (202) 628-8844  
JDE/MWR  
dn#2849674